ALTERNATIVE STOCK WATERING SYSTEMS

FINAL REPORT

A WATER QUALITY/QUANTITY IMPROVEMENT PROGRAM

SUBMITTED TO:

US FISH AND WILDLIFE SERVICE

Agreement # 14-48-0001-96617
ID # 319h-IV

Submitted by:
Siskiyou Resource Conservation District
Gary Black
PO Box 268
Etna, CA 96027

(916) 467-3975
Fax (916) 467-5617

96-319(h) 2 ph IV

Project Title: Alternative Stock Watering Systems

Siskiyou Resource Conservation District

ABSTRACT:

The purpose for implementing the alternative stock watering systems is to implement permanent or long term programs which reduce impacts effecting water quality. The Scott River Watershed has been listed as an impaired water body by the North Coast Regional Water Quality Control Board (NCRWQCB). The water quality impairments of the Scott River are water temperature and high sediment levels.

The Siskiyou Resource Conservation District (RCD) believes the two impairments adversely effect each other. The Scott River Watershed's high water temperatures are derived from excessive sediment contribution. Stream systems which have excessive sediment levels are characterized by having wide, unstable channels, braided channels, channels possessing poor width/depth ratios and channel aggradation. These are factors which make a stream susceptible to increased water temperatures. Inversely, characteristics known to reduce temperature levels include: increased water quantity, increased riparian cover (reduction of radiant heat contribution) and channels possessing quality width/depth ratios (tight channels). These characteristics also increase a channels capacity to transport sediment, which is as important as reducing sediment sources when attempting to reduce sediment levels.

So where do we start when attempting improve water quality? The upland property owners and managers are already collectively working to reduce upslope sediment sources and have changed many methods of operation. Therefore, the RCD decided to focus on eliminating factors which impact both water quality impairments. The RCD considered riparian planting to provide shade and reduce the width of the active channel but felt other funding sources will continue to fund revegetation projects. Only 319H funding recognizes the benefit of off-site stock watering systems. The RCD selected installing off site watering systems because they eliminate an adverse impact of water quality and allow for natural recovery.

Providing an alternative source of stock water to replace a stream eliminates the need for stock to enter riparian areas (improves both water quality impairments). In addition, an alternative source of stock water can also eliminate the need to divert surface flow for stock water (improves water temperature). Once the adverse impact is eliminated or reduced the natural recovery process is allowed to respond.

The current issue related to resource use revolves around anadromous fisheries and watershed health. The population of anadromous fisheries has generally declined throughout the Pacific Northwest during the past several decades. Academia has found that water quality is one of the limiting factors related to declining salmonid populations. The North Coast Regional Water Quality Control Board (NCRWQCB) has listed the Scott River has having two non-point source water quality impairments: excessive sediment and temperature levels at certain periods of the year. The NCRWQCB feels that insufficient flows have been one of the factors leading to high water temperatures during the late summer and early fall. Increased fall flows is a major goal of the Scott River Coordinated Resource Management Plan (CRMP) and the RCD.

Restoration projects within the floor of Scott Valley include riparian fencing, bank stabilization, implementation of fishery habitat improvement structures and replanting the riparian zone. This "holistic" approach includes practices which reduce high sediment levels and water temperatures within streams used by anadromous fish. It does not, however identify an alternative "off-site" (outside of the stream corridor and riparian zone) source for watering livestock which previously utilized surface flow from a stream or diversion ditch.

The lack of alternate watering sources looked to be the limiting factor which would reduce the scope of a holistic restoration approach throughout the watershed. If the RCD could provide an off-site watering source, many property owners who own livestock would agree to management changes within riparian zones and/or water efficient stock watering strategies on their property. Because only indirect benefits are gained by installing off-site watering systems, fisheries improvement funding sources have not been interested in funding such projects.

Previous funding from the 319h non-point source pollution water quality improvement funding has allowed the Siskiyou RCD to exclude livestock from 2.7 miles of the Scott River, and from .4 miles of Mill Creek. The off-site watering systems removed the need for approximately 475 head of cattle to enter riparian areas. The goal of the second phase was to install systems which would reduce the need to utilize diversion ditches for livestock watering purposes during low flow periods. This would increase fall flows as well as provide off-site watering sources.

OBJECTIVE:

The practice of developing an off-site watering system has been termed the Alternative Livestock Watering System (ALWS) by the RCD and the Scott River CRMP. The ALWS is now the catalyst for development of new restoration programs. A livestock watering system which meets the landowners management needs is a permanent solution to excluding or intensively managing cattle within riparian zones and surface flow. 1996 was a demonstration year where real costs and installation methods were developed and refined while improving water quality. An internal goal of the RCD was not only to install quality systems to demonstrate the benefit and feasibility to landowners, but to develop a project ranking system and cost reimbursement package for future projects. All

goals were met, including the foundation work which will provide long term water quality benefits. Without the ability to develop off-site watering systems reduction of adverse factors which limit water quality would have been reduced.

The objective of the projects installed in 1997 were to accomplish the same goals as 1996 but also increase fall flows by eliminating the need of diversion ditches to water stock. The increase in flows also allows adult chinook to access and utilize the prime spawning and rearing areas located in the upper portion of Scott Valley (Horn Lane to French Creek).

WATER QUALITY/QUANTITY BENEFITS:

As previously mentioned, increasing fall flows in the Scott River is one of the main objectives of the Scott River CRMP and the Siskiyou RCD. Stock water systems have also been mentioned as being the catalyst which allows riparian corridor restoration to take place. An off-site watering source allows the RCD to seek funding for fencing and riparian planting within the corridor. Fencing and riparian planting programs are more easily funded then stock watering systems.

The benefit to water quality is based on the permanent exclusion/intensive management via a grazing plan of livestock in the riparian area. Permanent exclusion then leads to restoration activities including riparian planting which traps sediment, improves sediment transport, improves width-depth ratio and provides shade. Water quantity is also improved by forming voluntary agreements with diversion users to utilize an ALWS rather then their adjudicated livestock watering right.

In 1997, two projects were selected for an ALWS. The water quality gain is the elimination of the need for surface water withdrawal (2.7 cfs) for watering stock, stock exclusion on 2,200 feet of riparian fencing on the Scott River and intensively managed grazing only on 2,800 feet of French Creek. The RCD was able to install another system that provided the opportunity to construct 3,000 feet along Mill Creek in Quartz Valley (fencing funding not yet secured). The Quartz Valley project also eliminated the need for surface water to be diverted to livestock (2.5 cfs from Mill Ck.).

In sum, roughly 500 head of cattle will be either excluded from riparian areas or intensively managed. 10,000 linear feet of riparian corridor will be protected from adverse impacts and allowed to recover, and approximately 5.2 cfs will be allowed to remain in the stream. Although 5.2 cfs seems rather small, the flow of the Scott River main stem has averaged 16 cfs at Ft. Jones during mid-October.

Project Names:	Stream Length Affected:	CFS to remain in stream:
Fowle Project	2,200' Scott River	0.0 cfs
Platt Project	2,800' French Creek	2.7 cfs
Hayden Project	3,000' Mill Creek	2.5 cfs

INSTALLATION OF STOCK WATER SYSTEMS:

An internal goal for the RCD was to develop standards which would enable us to prioritize and standardize proposed stock water systems based on water quality measures. The RCD developed a working document which standardized the cost scale of typical stock water components. The Standardization and Reimbursement Schedule is reviewed with the property owner before implementation begins. The property owner and RCD determine the extent of the landowners involvement during installment and his in-kind contributions. An estimated cost is developed using the standardized costs. The proposed project is then ranked using the Factors Determining Project Priority.

A typical alternative livestock watering system is designed and installed during the winter when stock water is plentiful and no irrigation will be taking place. The projects are designed to gain the maximum benefit for the least cost. A typical stock water system uses an existing well as its source of ground water. A small submersible pump is installed in the well casing. The pump size ranges from 3/4 to 1 1/2 horsepower depending on the number of troughs, the distance between pump and troughs and whether or not the system will double as a riparian revegetation irrigation system. The submersible pump is accompanied by a large pressure tank, pressure switch and a pressure sensor. The system is similar in design system installed in homes. The pump system is inside an insulated pump house with a concrete foundation.

Water is transported by through schedule 40 PVC pipe ranging in size from 3/4" to 1 1/2" in diameter. Pipe diameter is determined by a sliding scale which takes increase in elevation, length of run and desired flow volume at source into account. Friction draw-down inside the pipe is a major loss of pressure and flow volume over a long distance. The desired diameter of pipe is buried 24"-30" deep in the soil.

Troughs are also supplied by the RCD. The number of troughs and size depends on the number of livestock using the system and the management style related to cost/ benefit. The flow to the troughs is activated by a float valve which conserves water and power by eliminating the need for continuous flow.

LIVESTOCK WATERING CONCLUSION:

The Alternative Livestock Watering System showed that dependable off-site watering sources can provide long term benefits including increased water quantity, water quality, riparian revegetation and livestock management. Recipients of the systems contributed in-kind labor, equipment and design knowledge. All landowners are pleased with the new systems and their versatility. We feel these projects are the key to continued success in our efforts to improve water quality. We appreciate the assistance provided by the USFWS and the NCRWQCB in these efforts and invite you to see the projects.

319(h) Final Report - KRIS

Funding for KRIS included training, equipment upgrade, professional services, and project development. Training for KRIS provided by Dr. Jan Dirksen and Pat Higgins was held at College of the Siskiyous, Yreka, in October 1997. Three staff, two RCD and one CRMP, attended and learned how to create a topic in KRIS, import data, make a table, and edit captions. While the public and cooperators are welcome to use the station at the RCD office in Etna, only one CRMP member and Kier and Associates have requested access. Each time, a staff member was present to assist with access and navigation as necessary.

The RCD is committed to developing KRIS for project development and monitoring. The Mapping Needs Subcommittee of the Subbasin Planning Subcommittee of the Klamath Basin Task Force met at Humboldt State University, Arcata, to discuss each basin's mapping needs. The Scott identified parcel maps, soil maps, digital orthophotoquads, and refugia maps as needs.

In addition, the RCD is a member of the Scott River Watershed Temperature Monitoring Committee. Members include Timber Products, Fruit Growers, Siskiyou County Office of Education, and USFWS. The committee met in spring to coordinate the monitoring effort. The collective temperature data has not been analyzed yet to determine the influence of the stockwater systems on stream temperatures. Other monitoring and evaluation methods are being developed for stockwater systems and streambank stabilization by the CRMP Monitoring Committee. The 1998 season will have streamflow measurements at selected temperature stations in an attempt to correlate temperature with flows.

Without an accepted, effective monitoring plan in place, the schools were not able to monitor the impact of the stockwatering systems. Instead, the CRMP/RCD participated with the County Office of Schools in an educational workshop for Etna High School students. The students rotated between three stations: one station taught how to measure water quality parameters; another taught how to measure streamflow; and another taught how to dive and count fish. Other educational opportunities existed for measuring streamflow for fish screens and measuring water quality through temperature monitoring.

Many of the previous complications using KRIS were overcome by upgrading the computer system. In September, only 35 MB hard drive space was free; 50 MB free is recommended to prevent "General Protection Fault Errors". In addition, KRIS appears to work better with Windows95 than with Windows3.1. Additional memory was added in the form of RAM and hard drive space. The KRIS station now has Windows95 installed with 32 MB RAM and 3.1 GB HD. The original 700 MB HD is stall part of the system as an additional hard drive. Professional services provided by Christopher Lisle was needed to perform the upgrades. Year-end purchases include two Jaz cartridges and a scanner.

After sufficient equipment upgrade, ArcView was used to develop a map for a 1998 planting project. Jim Villaponteaux from the Salmon River Restoration Council (SRRC) provided technical assistance and a Trimble GPS unit for mapping of the Tobias

1/6/98

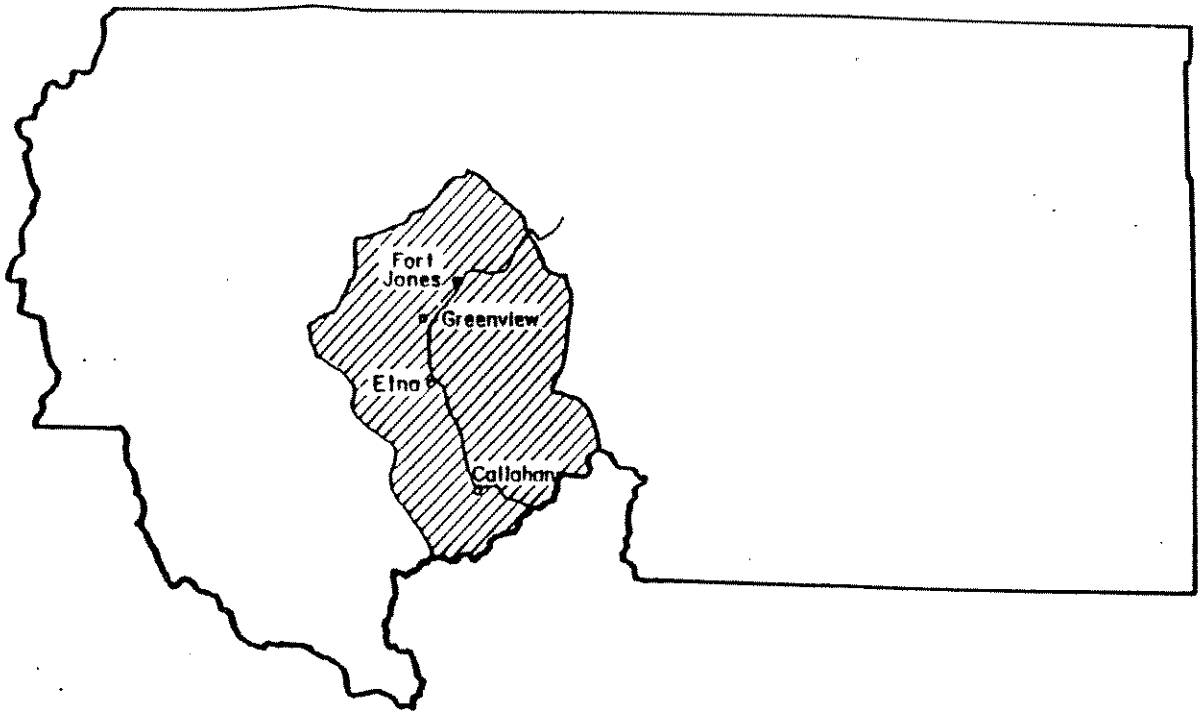
property. Jennifer Silveria from the USFWS attended also. Several attributes were used to characterize features such as roads, fencing, water sources, treatment areas, and existing tree stands. It is estimated that other mapping methods (i.e. distance wheel, tape measure, compass, transit) take twice as long without the level of detail, clarity, and flexibility provided by the ArcView project. Time spent learning how to use ArcView to make the map was charged to KRIS training. Other time was charged to the 1998 planting project funding agency.

FINAL BUDGET

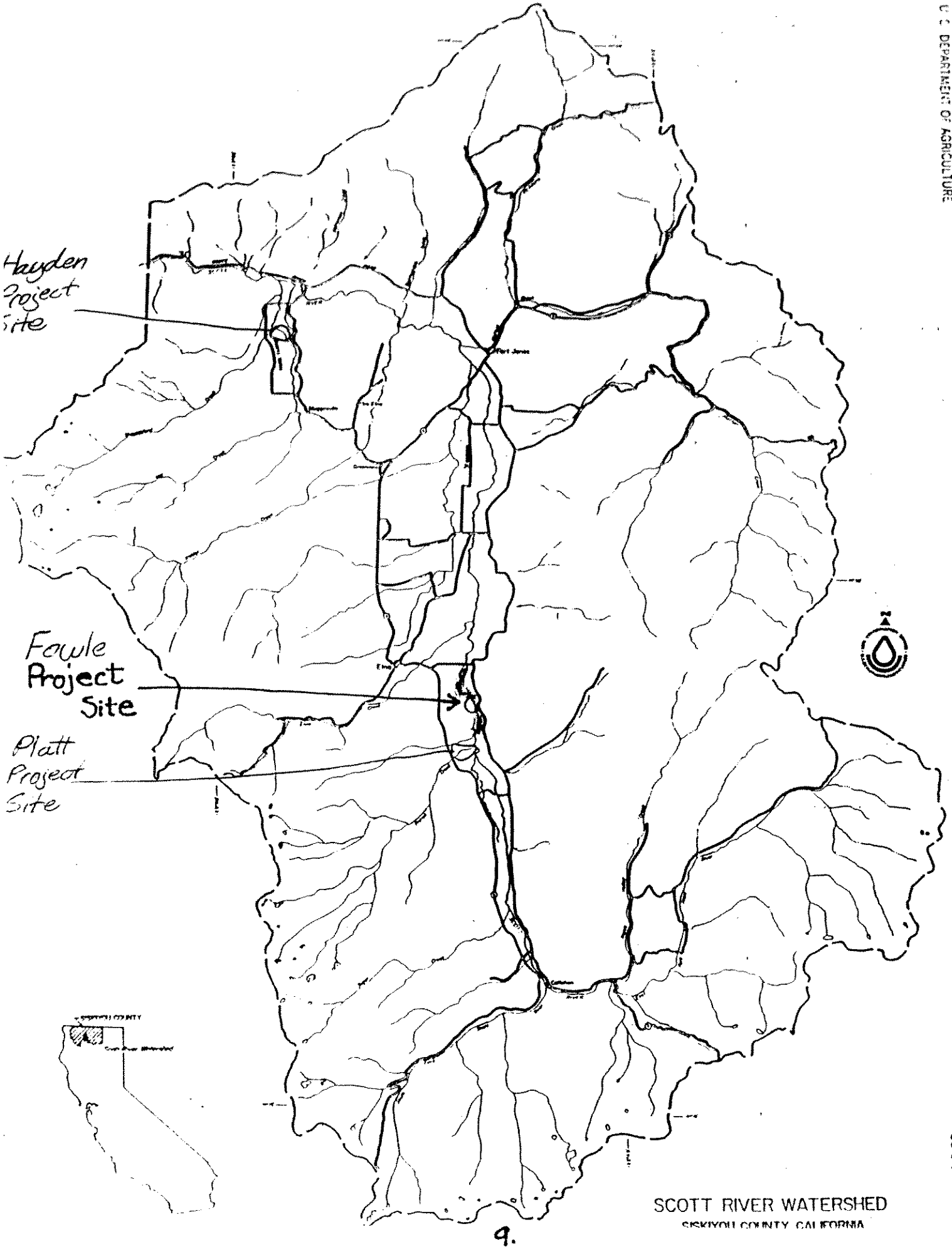
ALTERNATIVE STOCK WATERING SYSTEMS
AGREEMENT #14-48-001-96617
319h-IV

ITEM	BUDGET	ADJUSTED BUDGET	ACTUAL BUDGET
Personnel	$ 6,000.00	$ 5,481.00	$ 5,481.00
Professional Services	$ 3,000.00	$ 2,078.00	$ 2,078.00
Travel	$ 300.00	$ 383.68	$ 383.68
Materials/Supplies	$15,000.00	$13,055.15	$13,055.15
Operating Expenses	$ 3,000.00	$ 6,301.68	$ 6,301.68
Sub Total	$27,300.00	$27,300.00	$27,300.00
10% Admin. Exp.	$ 2,700.00	$ 2,700.00	$ 2,700.00
Total	$30,000.00	$30,000.00	$30,000.00

REGIONAL LOCATION

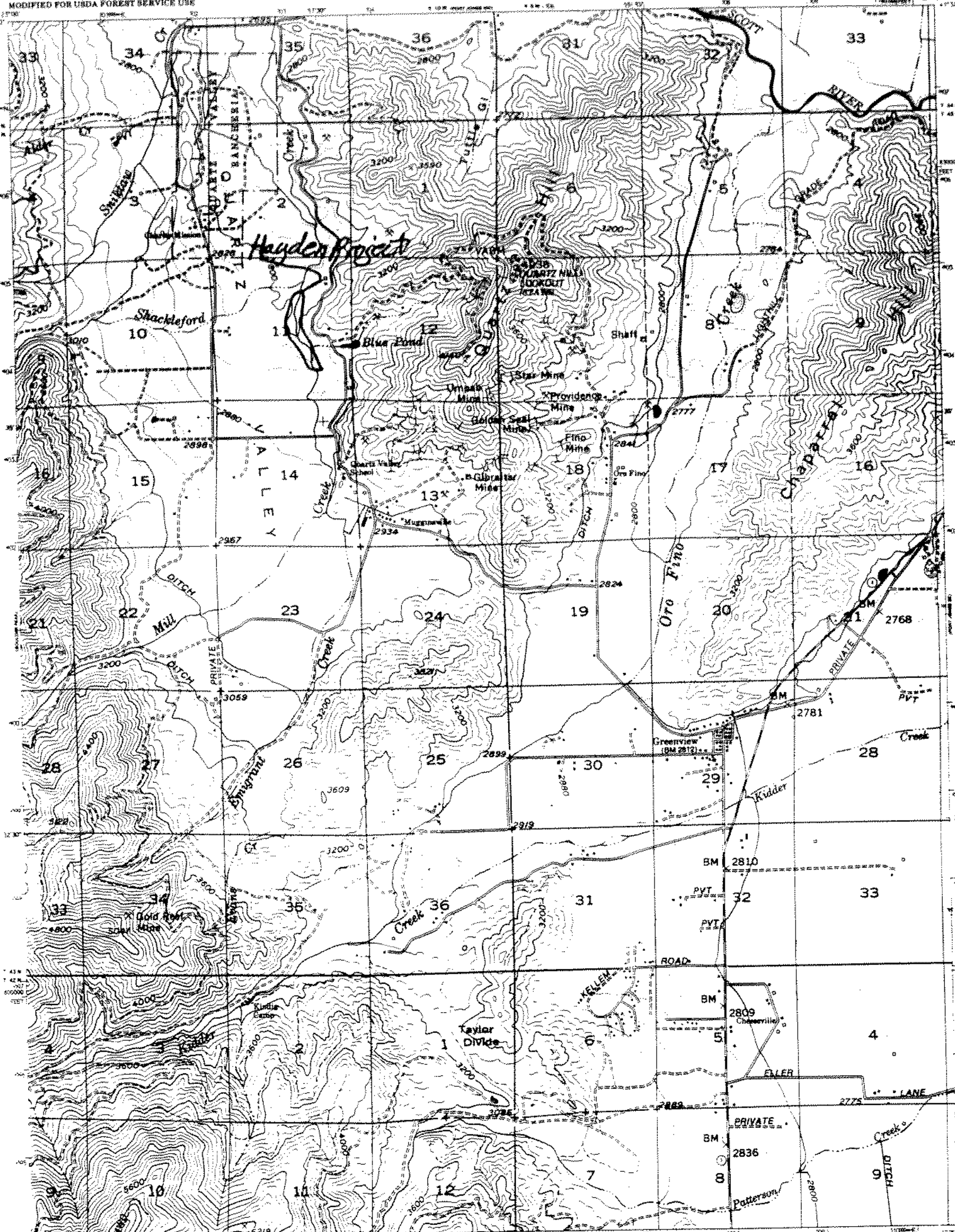


MAP A


Hayden Project Site
Fowle Project Site
Platt Project Site
SCOTT RIVER WATERSHED
SISKIYOU COUNTY, CALIFORNIA

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

FORT JONES SW QUADRANGLE
CALIFORNIA
7.5 MINUTE SERIES



SCOTT RIVER
Hayden Project
QUARTZ VALLEY
QUARTZ VALLEY RANCHERIA
Shackleford
Mill
DITCH
Blue Pond
Quartz Hill
QUARTZ HILL LOOKOUT
Star Mine
Umpah Mine
Providence Mine
Golden Seal Mine
Fino Mine
Oro Fino
Shaft
Quartz Valley School
Gibraltar Mine
Mugginsville
Oro Fino Creek
Chaparral Hill
PRIVATE
Emigrant Creek
Greenview (BM 2812)
Kidder Creek
Gold Reef Mine
ROAD
KELLEM
Kidder Camp
Taylor Divide
Cheeseville
ELLER LANE
Patterson Creek
PVT
BM 2768
BM 2781
BM 2810
BM 2809
BM 2836

Base map prepared by the U.S. Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1951. Field check 1954

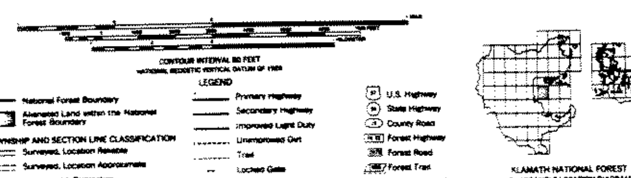
Polyconic projection 1927 North American datum
10,000-foot grid based on California coordinate system, zone 1
1000-meter Universal Transverse Mercator grid ticks, zone 10, shown in blue

INTERIM EDITION

Modification to USGS base map prepared by the Geometronics Service Center from 1982 aerial photography and 1983 correction guides furnished by the Pacific Southwest Region.

Landnet revised according to additional Forest Service evidence.

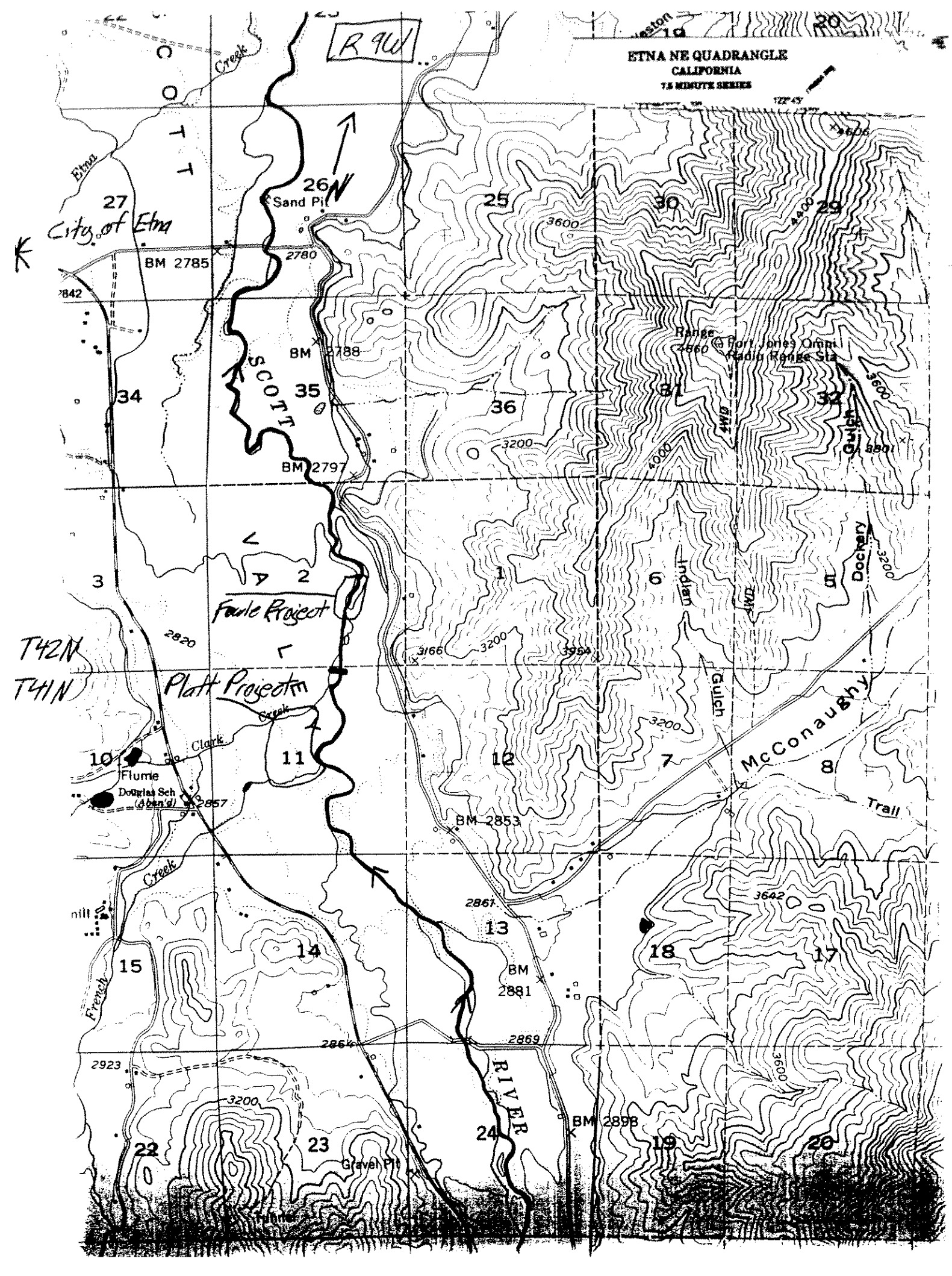
UTM GRID AND 1984 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET



CONTOUR INTERVAL 80 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
LEGEND
National Forest Boundary
Alienated Land within the National Forest Boundary
TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction
Primary Highway
Secondary Highway
Improved Light Duty
Unimproved Dirt
Trail
Locked Gate
Road, Location Approximate
U.S. Highway
State Highway
County Road
Forest Highway
Forest Road
Forest Trail
Trail, Location Approximate
KLAMATH NATIONAL FOREST
QUADRANGLE LOCATION DIAGRAM

FORT JONES SW, CALIF.
N4130-W12252.5/7.5
REVISED 1983

718-3C


ETNA NE QUADRANGLE
CALIFORNIA
7.5 MINUTE SERIES
R 9W
T42N
T41N
City of Etna
Sand Pit
BM 2785
BM 2788
BM 2797
Scott
Etna
Fowle Project
Platt Project
Clark
Creek
Flume
Douglas Sch (Aban'd)
BM 2853
McConaughy
Trail
Indian
Gulch
Dockery
Range
(Fort Jones) Omni
Radio Range Sta
BM 2881
BM 2898
Gravel Pit
RIVER
French
Creek
Flume